

Work Order ID 51080

July 30, 2009 10:27:13 AM



Page 1

Item ID: D212-664-107

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: *mf*

Date: 09-07-30

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev-A

0.00

100



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

502/08/26

0.00

110



Packaging

Packaging

Packaging

Memo

0.00

9/8/26 (K) 50

0.00

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

DD 9-8-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 51080

July 30, 2009 10:27:13 AM



Page 2

Item ID: D212-664-107

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Start Date: 08/03/2009 Start Qty: 1.00



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Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

2) S o r l o s / 3



140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill Rivet holes as per Dwg D212-664-147 using DT8972. 2-Drill pilot holes in tube as per Dwg D212-664-147 3-Ream hole to finish size in tube as per Dwg D212-664-147 4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-6

AWM 7-8-14



K 9/8/14

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1 phi - AWM 7-8-14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 51080

July 30, 2009 10:27:13 AM

Page 3

Item ID: D212-664-107

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Revision ID: A

Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009 Start Qty: 1.00

Required Date: 08/21/2009 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

160



QC

Quality Control

QC3- Inspect Part Finish

Memo

0.00

0.00

=> 8/8/17

(X)

✓

170



QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

0.00

0.00

=> 8/2/17

(X)

✓

180



Outsource2

Outsource process - NDT

Outsource process - NDT per QSI038 4.1

Memo

0.00

0.00

Liquid Penetrant Inspection as per QSI 038 Or ☐ Issue P/O: 10220 LPI as
per ASTM 1417 ☐ Level 2 Attach copy of NDT results to work order

CY 09/08/19 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID' 51080

July 30, 2009 10:27:13 AM



Page 4

Item ID: D212-664-107

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Revision ID: A

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

190

0.00



Packaging

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

PC 9/8/08 (2)

200

0.00



QC5- Inspect part completeness to step on W/O

QC

Memo

0.00

Quality Control

Inspect for damage & ensure results are as per Dwg D412-664-203

MA 08 19 (1)

210

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-147, with Sika flex in Between tube & Cuff A/R SIKAFLEX -241/-291 BATCH: 112 391

RT 09-08-18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Work Order ID 51080

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Stop



Start Date: 08/03/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 ☐ PRIME: ☐ Start Time: 10:00 ☐ Finish Time: 11:30 ☐ PAINT: ☐ Start Time: 3:00 ☐ Finish Time: 4:00

ST 09-08-19

ST 09-08-24

230

0.00



QC

QC14- Inspect Spray Paint

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

ST 09-08-20 (1)
2 09-08-25 (1)

240

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147 2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging. ☐ Time & date of applic

ST 09-08-20

ST 09-08-25

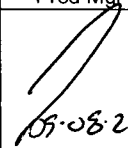
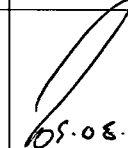

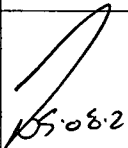
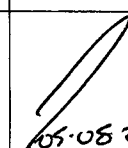
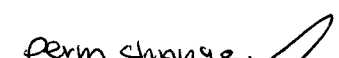
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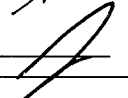
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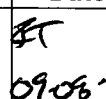
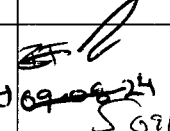
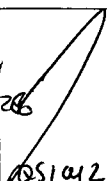

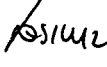
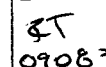
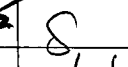
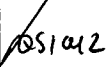
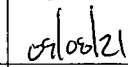
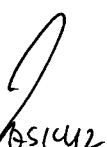
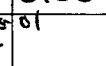
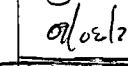


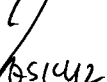
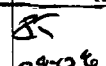
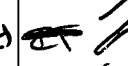
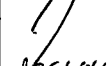

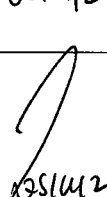
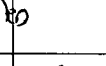
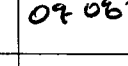
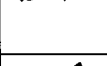


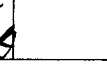



exp 10-08-01

PHO →

Dart Aerospace Ltd

W/O: 51080		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
09-08-21	240	Please clarify the memo @ 240 for the support spacing to define more the DEO : standard drawing. Add in Bold letters. D212-664-107 → Per DWG D212-664-147 <u>install supports with a spacing of 28.00"</u>				 09-08-21	 09-08-21
↓	↓	D212-664-107 B → Per DEO D212-664-107-A-1... install supports with a spacing of 27.50"		09/08/21		 09-08-21	 09-08-21
perm change. 							

Part No: D212-664-107 PAR #: N/A Fault Category: Crossrube NCR: Yes No DQA: A Date: 09-08-28
 Resolution: re-work Disposition: re-work QA: N/C Closed:  Date: 09-08-28

NCR: 51080		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
9/8/21	#240	During inspection it was found that the supports were installed incorrectly. The measurement of the supports should		Remove both supports and remove all magnabond from the tube and supports	 09-08-21	 09-08-21		
		be 28.00" but the one is 27.375".		Re assemble as per DWG D212-664-147	 09-08-21			
		DE employee was under the impression that the were 214's		magnabond B# 11249 exp 10-08-01	 09-08-21			
		Due to a DEO that was attached		Scuff center area lightly and mask off the area not to be painted	 09-08-21			
		R.C: Human error. LOA to dwg detail.		Clear & re-paint supports	 09-08-21			
				Re paint as per Q57005 Wilman	 09-08-21			
				See above procedure change as well for clarification				

NOTE: Date & initial all entries

Work Order ID 51080

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Item ID: D212-664-107

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: Date:

Tooling: Date:

Run Start



QC: Date:

SPC (Y/N): Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00

278 08/02/2009



QC

Memo

0.00

②

/

Quality Control

260

QC4- 100% Inspect kits for completeness

0.00

278 08/02/2009



QC

Memo

0.00

②

/

Quality Control

270

Packaging

0.00



Packaging

Memo

0.00

D 08/12/2009

Packaging

Identify and pack for shipping as per PPP D212.664-107

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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Required Date: 08/21/2009 Req'd Qty: 1.00



Customer:

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Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

290

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

09/08/27 HJ

PL 09-8-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 30, 2009 10:27:12 AM

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Work Order ID: 51080



Parent Item: D212-664-107RevA



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009

Required Date: 08/21/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3428-1RevA		Manufactured	No			100	Each	56.0000	1.0000			
Placard												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

16

47310

6

48359

10

Main Warehouse

ST096

40

50790

40

D212-664-
107TRNRevA

Manufactured No

140

Each

0.0000

1.0000



Crosstube Turning Detail

D3659-1RevB

Manufactured No

220

Each

8.0000

2.0000



CUFF

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

8

37426

8

351163



8-50702 MB 09-08-13 (X)

2 M 9/8/13

2 M 9/8/14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 30, 2009 10:27:12 AM

Work Order ID: 51080



Parent Item: D212-664-107RevA



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009

Required Date: 08/21/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
CR3212-4-06		Purchased	No			240	Each	346.0000	44.0000			
CHERRY RIVET												

09-08-18

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

346

107534

346

D2893-1RevB

Manufactured

No

240

Each

72.0000

2.0000



2.75 Support

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

72

25657

6

43479

10

46488

18

47109

18

47637

20

09-08-20

x2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 30, 2009 10:27:12 AM

Work Order ID: 51080

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd


Start Date: 08/03/2009

Required Date: 08/21/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3595-063-450RevA		Manufactured	No			240	Each	47.8000	4.0000			
 RUBBER CUSHION												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 47.8

38959 2

43210 4.8

46465 41

RT 09-08-20

AN6-35A

Purchased

No

260

Each

134.0000

4.0000



BOLT

84

1111650

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 134

111605 34

112314 100

9/18/26 @ SP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 30, 2009 10:27:13 AM

Work Order ID: 51080

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd


Start Date: 08/03/2009

Required Date: 08/21/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-36A  Bolt		Purchased	No			260	Each	169.0000	4.0000			

111650 SP

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	169	
109632	1	
110382	18	
111650	50	
112314	100	

AN960JD616



Washer

Purchased

No

260

Each

1,326.000 18.0000



Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	1326	
107242	3	
107959	6	
109371	8	
110704	23	
111193	18	
111607	268	
112314	1000	

112314 SP

9/8/09 (R)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 30, 2009 10:27:13 AM

Work Order ID: 51080

Parent Item: D212-664-107RevA

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 08/03/2009

Required Date: 08/21/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

MS21042L6

Purchased

No

260

Each

755.0000

6.0000



Nut

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

755

105077

22

110002

233

111548

100

111578

400

M110002
9/8/26 (10)
SP

MS21920-25

Purchased

No

260

Each

156.0000

4.0000



Clamp(per MIL-DTL-8783C)

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

156

107456

2

108111

3

108975

17

109181

48

109644

10

111282

50

111429

25

111883

1

RT 09 08 20

X4

July 30, 2009 10:27:13 AM

Shop Packet Print

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

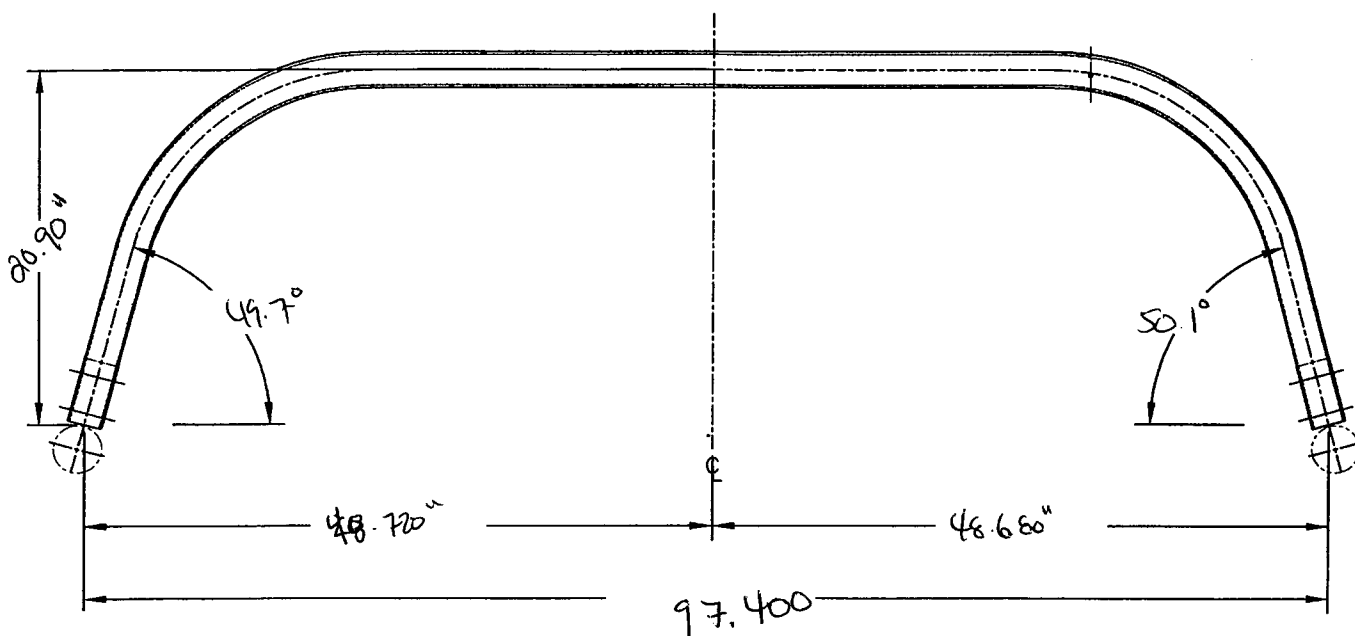
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	51080
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	S
Date	07/08/13

51080
 sub
 09-07-20

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

PARTS LIST:

Qty	Part Number	Description
X	D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
1	D6019-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
2	D3659-1	CUFF
4	MS21920-25	CLAMP (OR MS21920-26)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-2411-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)


GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.53±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-2411-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

DEO ATTACHED

RELEASED
07.09.24

51080

A		07.07.07	NEW ISSUE	
DESIGN <i>97</i>		DRAWN BY <i>97</i>		 DART AEROSPACE LTD. <small>HAMMERSBURY, ONTARIO, CANADA</small>
CHECKED <i>97</i>		APPROVED <i>97</i>		
DATE		TITLE		REV. A
07.07.07		CROSSTUBE (205/212/412 LOW FWD) NTS		SHEET 1 OF 3

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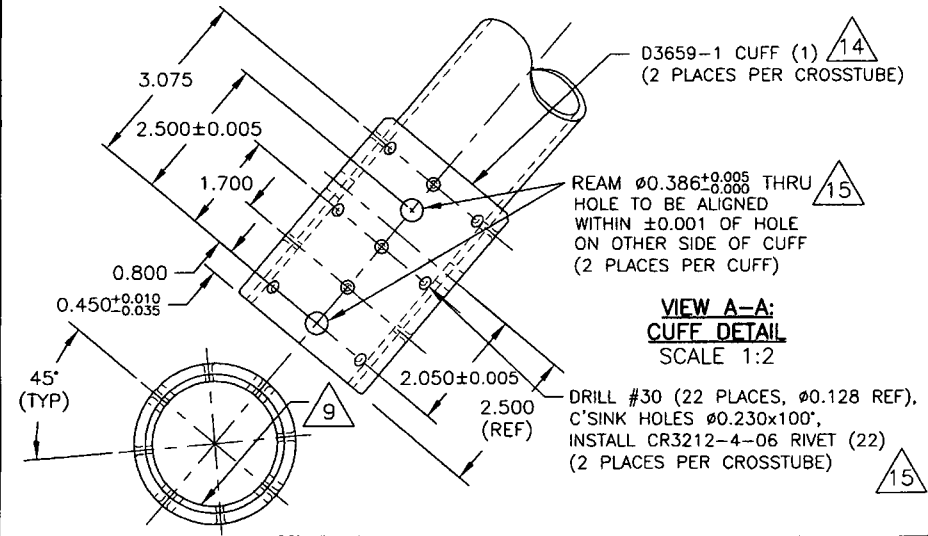
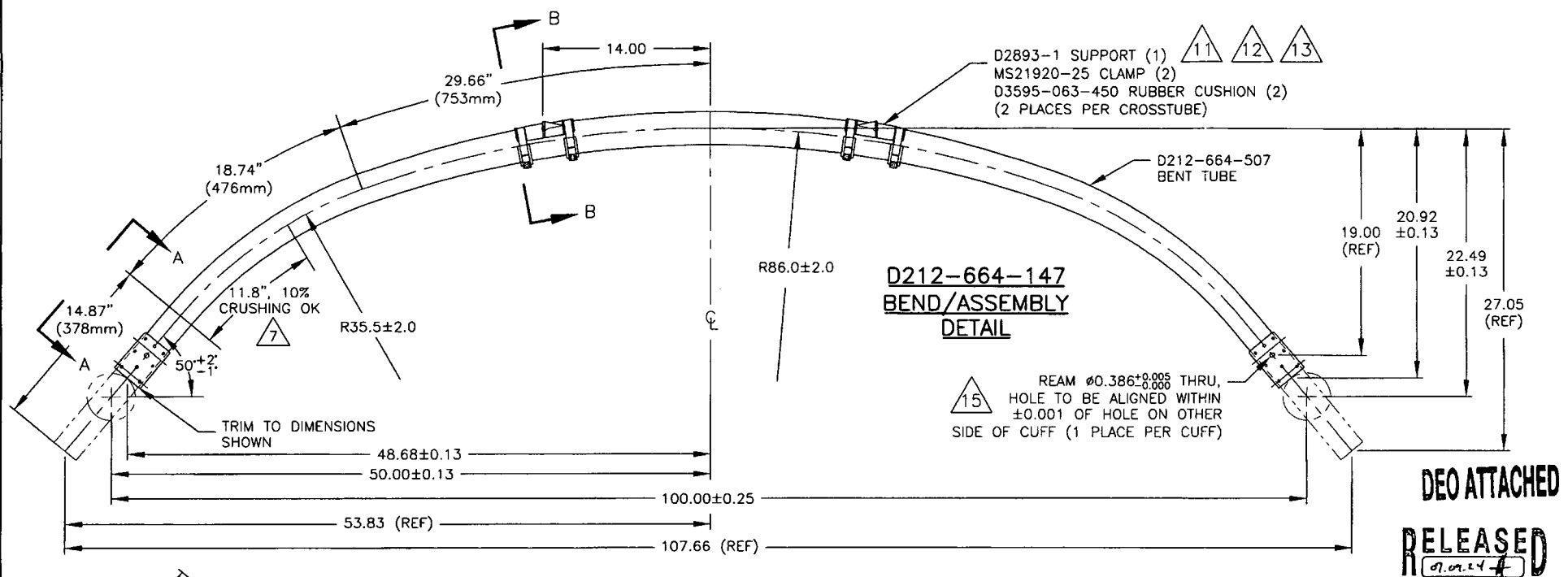
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

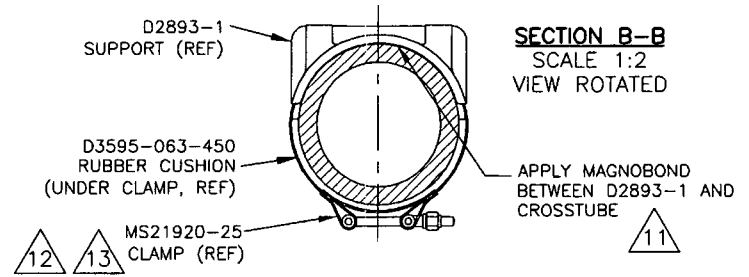
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



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		DATE		TITLE	SCALE
		07.07.07		CROSSTUBE (205/212/412 LOW FWD)	1:8

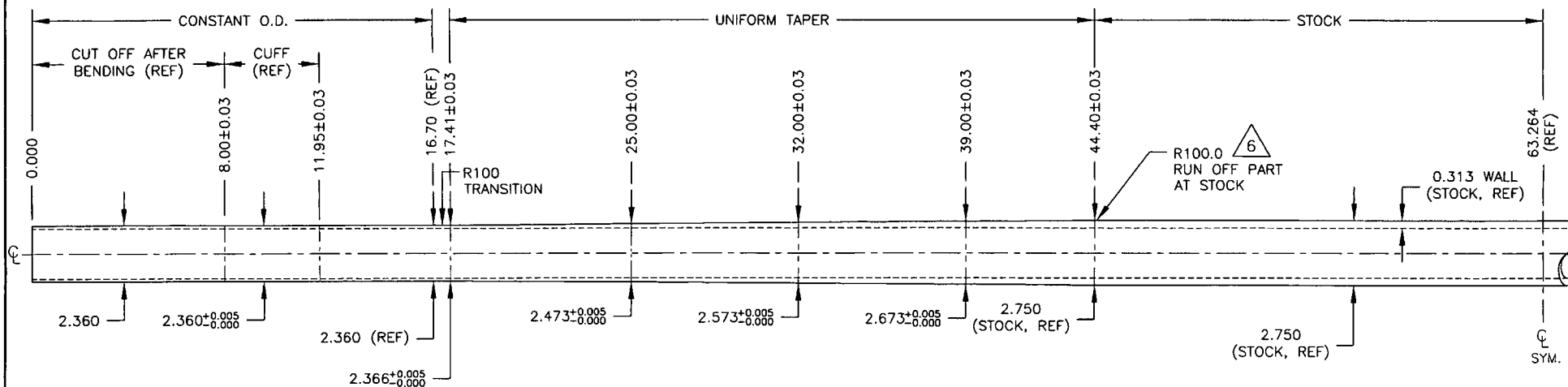
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-147 MACHINING DETAIL

RELEASED
07.07.24

DEO ATTACHED

51080

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DATE 07.07.07		TITLE CROSSTUBE (205/212/412 LOW FWD)		SCALE 1:4	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-147	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>JD</i>	CHECKED <i>PA</i>	MFG. APPR. <i>E</i>	APPROVED <i>MD</i>		DE APPR. <i>SH</i>		
DATE 09.05.01	DATE 09.06.15	DATE 09.06.15	DATE 09/06/16		DATE 09/06/16		

CHANGE:

ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)

THE D212-664-147B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-147 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-147 CROSSTUBE.

RELEASED
09/06/22

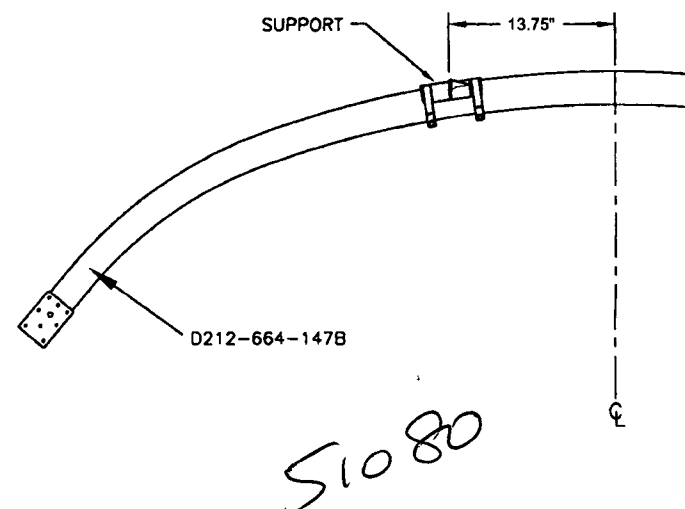


FIGURE 1 - SUPPORT INSTALLATION

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
SKIDTUBES.

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Revision: F
Date: 08.09.05

51080



LIQUID PENETRANT TEST REPORT

P- 14947

CLIENT	DART Aerospace	DATE	Aug 18-2009	PAGE	1	OF	1
ATTENTION	LINDA/CHANTEL	ACUREN JOB NO.	188-09-001487	TIME	AM	<input checked="" type="checkbox"/>	PM <input type="checkbox"/>
ADDRESS	1270 ABERDEEN ST. HAWKESBURY ON K6H 1K7	PO/NO.	10720	WORK LOCATION	HAWKESBURY SHOP		
PROJECT	F.P.I. ON MACHINED PARTS AND CROSS TUBES			ACCEPTANCE STD.	ASTM 1417	REV./DATE	2007
ITEM(S) EXAMINED	34 ITEMS						

JOB DESCRIPTION	PROCEDURE NO. LT-1002	REV./DATE	TECHNIQUE NO. LT-1002	REV./DATE
PART NO.	MATERIAL STAINLESS STEEL THICKNESS ALUMINE ALUMINUM			
SCOPE	WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT 100% EXTERNAL			

TEST DETAILS	
METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND MAGNAFLUX	BLACK LIGHT S/N 16459 <input type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT 2LG7 MINIMUM DWELL TIME 45 10 MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME > 10 MIN.	OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN.	LIGHT METER S/N
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	CAL DUE DATE DEC. 8-2009

TEST SURFACE	
SURFACE CONDITION <input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE <input type="checkbox"/> < - 4°C/ 20°F <input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F <input type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F	

RESULTS- (<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL)			
ITEM	COMMENTS	ACCEPT	REJECT
1- CROSS TUBE .W.O. 50803		✓	
1- CROSS TUBE .W.O. 50802		✓	
1- CROSS TUBE .W.O. 51082		✓	
1- CROSS TUBE .W.O. 51081		✓	
1- CROSS TUBE .W.O. 51080		✓	
1- CROSS TUBE .W.O. 50804		✓	
1- CROSS TUBE .W.O. 50981		✓	
1- CROSS TUBE .W.O. 50980		✓	
7- STUDS .W.O. 50931		✓	
16- STUDS .W.O. 50936		✓	
ALL PARTS EXAMINED ON THIS REPORT HAVE BEEN FOUND ACCEPTABLE TO STD. MM 09 08 17			

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES			
CLIENT REPRESENTATIVE	WALT MURDOCH	Signature	DTR # E-20071
TECHNICIAN (SIGNATURE):	M. Keith Johnston	Signature	REPORT REVIEWED BY:
NAME (PRINT):	M. Keith Johnston	2 ND TECHNICIAN	NAME INITIALS
CGSB LEVEL	II SNT LEVEL	CGSB LEVEL	SNT LEVEL
CGSB REG. NO.	6066	CGSB REG. NO.	